

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

REC'D 13 MAY 2005



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Applicant's or agent's file reference PCA30425/PSC	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/KR2003/000857	International filing date (day/month/year) 28 APRIL 2003 (28.04.2003)	Priority date (day/month/year) 09 JANUARY 2003 (09.01.2003)
International Patent Classification (IPC) or national classification and IPC IPC7 C07F 9/22, C07H 21/00		
Applicant POSTECH FOUNDATION et al		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 3 sheets, including this cover sheet.
- ☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).
- These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:
- I ☒ Basis of the report
 - II ☐ Priority
 - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
 - IV ☐ Lack of unity of invention
 - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
 - VI ☐ Certain documents cited
 - VII ☐ Certain defects in the international application
 - VIII ☐ Certain observations on the international application

Date of submission of the demand 26 JULY 2004 (26.07.2004)	Date of completion of this report 14 APRIL 2005 (14.04.2005)
Name and mailing address of the IPEA/KR  Korean Intellectual Property Office 920 Dunsan-dong, Seo-gu, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Authorized officer MOON, Sun Heup Telephone No. 82-42-481-5543 

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/KR2003/000857

I. Basis of the report

1. With regard to the elements of the international application:*

- ☐ the international application as originally filed
- ☒ the description:
 pages 1 - 25, as originally filed
 pages NONE, filed with the demand
 pages NONE, filed with the letter of _____
- ☒ the claims:
 pages NONE, as originally filed
 pages NONE, as amended (together with any statement) under Article 19
 pages NONE, filed with the demand
 pages 26 - 27, filed with the letter of 08 MARCH 2005
- ☒ the drawings:
 pages 29-32, as originally filed
 pages NONE, filed with the demand
 pages NONE, filed with the letter of _____
- ☒ the sequence listing part of the description:
 pages 1 - 6, as originally filed
 pages NONE, filed with the demand
 pages NONE, filed with the letter of _____

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language English which is

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☒ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☒ contained in the international application in written form.
- ☒ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☒ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☒ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☒ The amendments have resulted in the cancellation of:

- ☒ the description, pages NONE
- ☒ the claims, Nos. NONE
- ☒ the drawings, sheet NONE

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item I and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION

International application No.

PCT/KR2003/000857

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**1. Statement**

Novelty (N)	Claims	1 - 2	YES
	Claims	NONE	NO
Inventive step (IS)	Claims	1 - 2	YES
	Claims	NONE	NO
Industrial applicability (IA)	Claims	1 - 2	YES
	Claims	NONE	NO

2. Citations and explanations (Rule 70.7)**1. Reference is made to the following documents:**

- D1: US 5969128 A (La Region Wallone) 19 OCTOBER 1999
D2: Marie-Laurence Fontanel et al. 'Sterical recognition by T4 polynucleotide kinase of non-nucleosidic moieties 5'-attached to oligonucleotides', Nucleic Acids Research, Oxford Univ. Press, 1994, v.22, no.11, pp.2022-7
D3: De Vos, M.J. et al. 'New non-nucleosidic phosphoramidites for the solid-phase multi-labeling of oligodeoxyribonucleotides', Nucleosides & nucleotides, 1994, v.13, no.10, pp.2245-65
D4: Wilk, Andrzej et al. 'Backbone-modified oligonucleotides containing a butanediol-1,3 moiety as a vicarious segment or the deoxyribosyl moiety-synthesis and enzyme studies', Nucleic Acids Research, Oxford Univ. Press, 1990, v.18, no.18, pp.2065-8

2. Novelty and Inventive Step

The subject matters of the present invention relate to a novel phosphoramidite compound which can be used in the synthesis of DNA variants by introducing a desired functional group, e.g. benzyl glycolate, lithocholic acid, pentaerythritol, and dendrimer.

The prior art documents, D1-D4 relate to the phosphoramidite compound of 1,3-butanediol functional substituent.

None of the prior art documents disclose or teach various functional groups like benzyl glycolate, lithocholic acid, pentaerythritol, and dendrimer. In the light of the chemical structural difference among the present invention and D1-D4, it is not obvious to the skilled in the art to select the functional groups of the present invention which essentially differ from those of D1-D4.

Therefore, the subject matter of claims 1-2 is considered to be novel and to involve an inventive step under PCT Article 33(2)-(3).

3. Industrial Applicability

The subject matter of the claims 1-2 is considered to be industrially applicable under PCT Article 33(4).

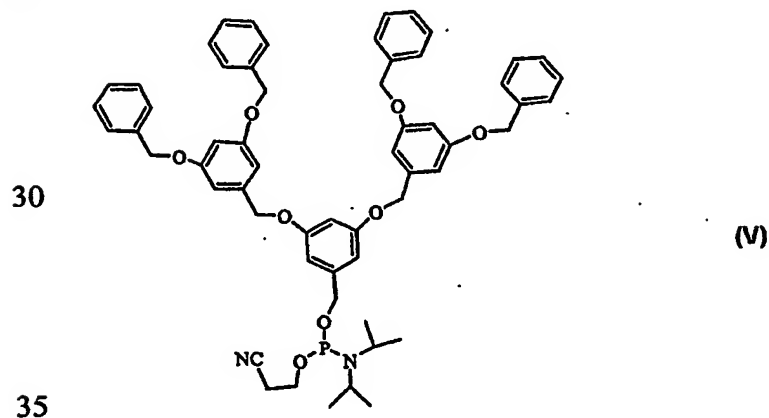
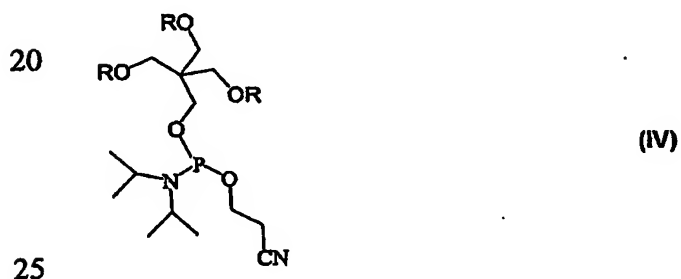
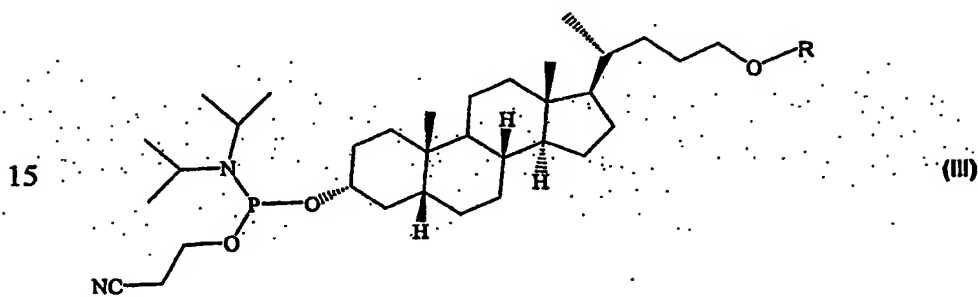
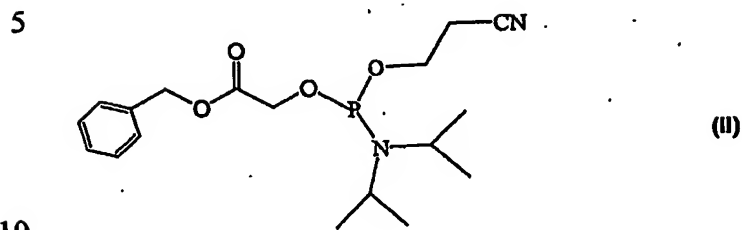
Amendment to the Claims

Please replace originally filed pages 26 and 27 with the enclosed new pages 26 and 27, wherein claims 1 and 2 have been amended.

AMENDED SHEET (ART. 34)

What is claimed is:

1. A phosphoramidite compound of formula (I), (II), (III), (IV) or (V):



wherein;

R is a dimethoxytrityl (DMTr), levulinyll (Lev) or tert-butyltrimethylsilyl (TBDMS) group.

- 5 2. The compound of claim 1, which is selected from the group consisting of:

O-((2-cyanoethyl)-*N,N*-diisopropyl-phosphoramidite)-benzylglycolate;

- 10 O-DMTr-((2-cyanoethyl)-*N,N*-diisopropyl-phosphoramidite)-lithocholic alcohol;

O-tri-DMTr-((2-cyanoethyl)-*N,N*-diisopropyl-phosphoramidite)-pentaerithritol;

O-DMTr-O-di-Lev-O-((2-cyanoethyl)-*N,N*-diisopropyl-phosphoramidite)-pentaerithritol; and

- 15 O-DMTr-O-Lev-O-TBDMS-((2-cyanoethyl)-*N,N*-diisopropyl-phosphoramidite)-pentaerithritol.